

## Motorized circuit breakers sequence sound system AC power!

### The new LynTec SEQUENCING PANELBOARD

is a heavy-duty, time-sequenced, AC power control for audio/video installations.

The SP series expands on the popular SLC line of Sequencing Load Centers.

**How it works:** Applies AC to low level electronics... waits for them to stabilize... (clicks and pops are ignored by un-powered power amps)... AC is then sequenced to power amplifiers to spread high inrush currents over time.

Protects valuable loudspeaker systems by delaying turn-on until all low level equipment has stabilized.

### Panelboard BENEFITS

- Additional wiring space
- Separate Technical Ground cabinet
- 200% neutral for nonlinear loads
- Bolt-on breaker & main-lug options

### LynTec Sequencer BENEFITS

#### ✓ ONE TOUCH remote power control

Immediate visual feedback provided by flashing ON switch.

Light stays ON to verify sequence completion. Process is reversed for turn-off sequence.

May be controlled from one to six locations.

Multiple panelboards may be daisy-chained for unlimited expansion in large facilities.

#### ✓ Reduced installation labor

One wall-mounted, panelboard cabinet feeds sequenced AC power to all rack and console receptacles.

#### ✓ Low power consumption

MB series motorized circuit breakers require no holding current (like DC relays) or cooling fans (like solid state relays).  
*Runs cool — lasts long.*

#### ✓ High reliability, time proven circuit breakers — UL Listed

Square D HACR (Heating Air Conditioning Rated) breakers have high inrush capability and 10,000 amp interrupting capacity. Eliminates nuisance breaker tripping.

All class 1 components (120/240V or 208/120V) are UL/CSA listed. Low voltage cabinets are UL & ULc listed.

#### ✓ Automatic load shedding

Zip-off system automatically sheds load when power fails. Stored energy zips-off all circuits 2 seconds after power fails. Re-sequences when power resumes without operator intervention.  
*Smart wake-up is ideal for unattended systems.*

Reduces start-up load for auxiliary power units.

#### ✓ Zip-Off switch — panic shutdown

Optional operator switch to trigger Emergency Shutdown in case of a sound system loss of processor control.

#### ✓ Emergency Shutdown

Disables sound system 2.5 seconds after an external contact opening. Quick sound system shutdown for fire-alarm or other emergency system.

Emergency Shutdown is a standard function on all SP Panelboards.

#### ✓ Interfaces with other LynTec sequencers



### ONE TOUCH REMOTE POWER CONTROL

SHOWN ACTUAL SIZE

Green LED illuminated      Red

#### SS-2 Sequencer Switch Set

One switch set supplied, additional sets optional.

Sequencer supports up to six switch sets for remote control of sound system AC power from several locations.

Mount in 5/8" round holes on 1" centers.  
4 – 22 ga. wires required,  
10,000 ft. maximum run.

Optional SS-2PL  
Locking Switch Plate



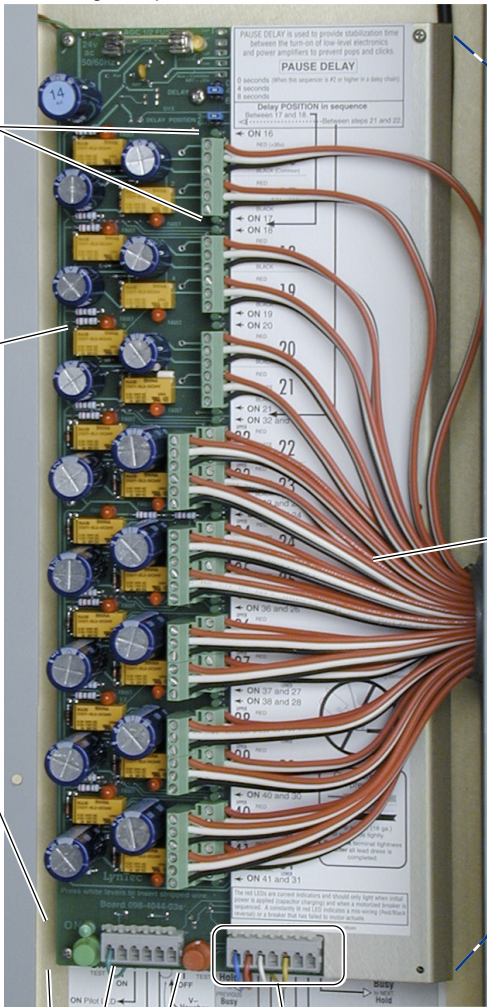
The **SP 341-16** & **SP 341-26** use one board only.

The **SP 341-41** uses two boards, daisy-chain wired.

Two boards may also be used as separate sequencers for different systems.

**Extensive use of LEDs speeds performance testing**

Low Voltage Sequencer Circuit Board



Green **ON** indicator LEDs for each breaker give full visual indication of sequencer action and status.

Red LEDs for each breaker show a short-time glow for normal capacitor charging and motor current.

When continuously lit a **FAULT** is indicated.

A mis-connected breaker or incomplete breaker motor transition will cause a fault.

Local **PILOT LED** Sequencer capable of driving the LEDs in up to 6 **SS-2** Switch Sets.

Low voltage connections for supplied **SS-2** Switch Set.

Daisy-chain connections for system expansion

ON and OFF push-button switches for system

Low Voltage Sequencing Section

**SEQUENCER POWER** breaker  
A supplied 10 Amp. un-motorized breaker in #1 slot feeds 24 v transformer from **A** phase. See facing page for phase explanation.

Emergency Shutdown terminals standard.

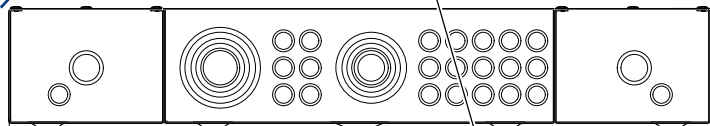
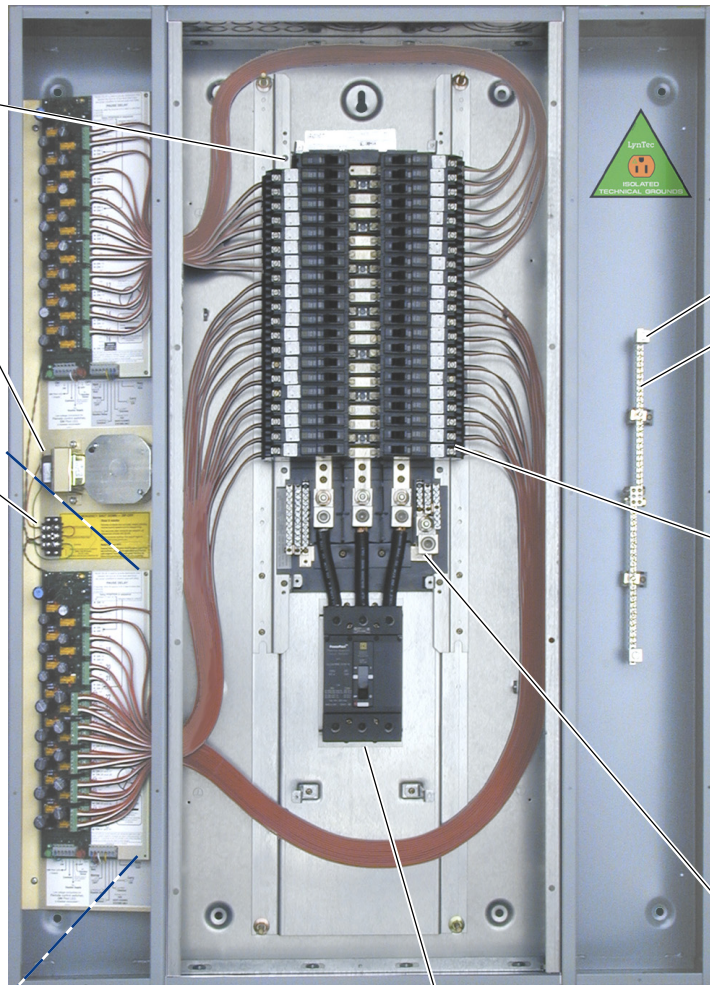
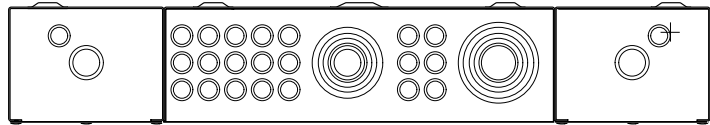
Opening external 1A, 24v contacts zips-off all motorized breakers in 3 seconds.

Optional **ZOS-1** Zip-Off switch available for quick, operator-controlled, shutdown.

3 wire, low-voltage, 60" pigtail with 600 volt insulation from each motorized branch breaker.

Connects to sequencer board terminals in low voltage cabinet to provide 24 volt actuation power for remote control.

Top end view



Bottom end view

36.00"

KDL 32225

225 A Main Breaker Standard (65 kVA)

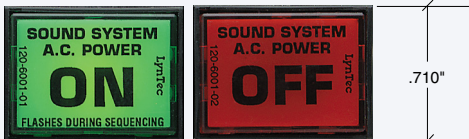
See page 4 for main options.

Interior factory installed for bottom feed.

May be field reversed for top feed.

**SS-2 Sequencer Switch Set**

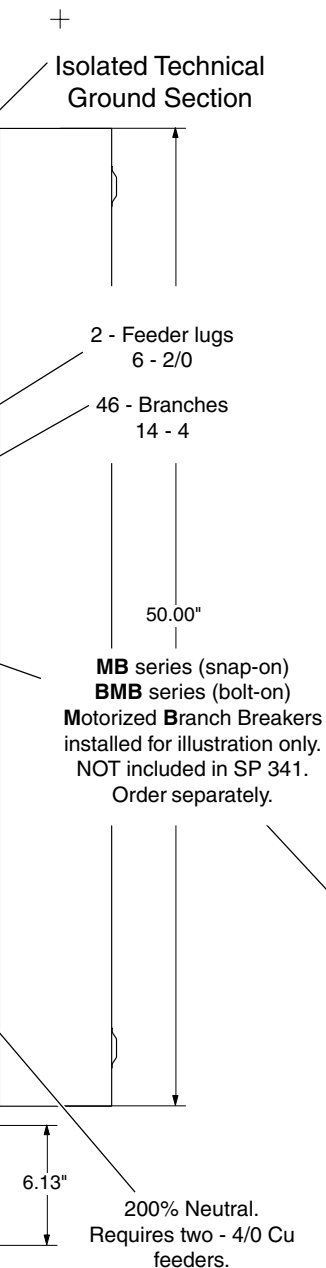
One switch set supplied, additional sets optional.



Sequencer supports up to six switch sets for remote control of sound system AC power from several locations.

Mount in 5/8" round holes on 1" centers.  
4 - 22 ga. wires required,  
10,000 ft. maximum run.





**Why connect in this order?**

It is important that the SEQUENCER POWER and the Front End electronics (Mixer, Signal Processing, EQ's, Delays) be powered by the same phase.

**Why?**

In the unlikely event of a phase leg failure, there are three possibilities:

**A leg fails:**

Power is lost to the sequencer. The sequencer will zip-off the complete system 2 seconds after power fails. When the A leg power resumes, the sequencer will re-sequence in the orderly turn on fashion you would expect... Front end first, power amps last. No unexpected clicks, pops or booms.

**B or C leg fails:**

The B and C legs are powering only power amplifiers. When power fails... no problem except the loss of audio from those power amps on the lost phase leg. The front end remains functional and the lost amps will wake up normally.

If parts of the Front End are powered from different phases, the actions of those components being powered-up in a random order is much less predictable.

**Recommended Panel Schedule Format**

SEQUENCER POWER	Phase	Breaker #	Sequencer Step #
..... 7	A	1	..... 7
..... 9	B	3	..... 9
..... Front end 2	C	5	..... 10
..... 11	A	7	..... Front end 3
..... 13	B	9	..... 12
..... Front end 4	C	11	..... 14
..... 15	A	13	..... Front end 5
..... 17	B	15	..... 16
..... 19	C	17	..... 18
..... Front end 6	A	19	..... 19
..... 20	B	21	..... 21
..... 22	C	23	..... 23
..... 24	A	25	..... 25
..... 26	B	27	..... 27
..... 28	C	29	..... 29
..... 30	A	31	..... 31
..... 32	B	33	..... 33
..... 34	C	35	..... 35
..... 36	A	37	..... 37
..... 38	B	39	..... 39
..... 40	C	41	..... 41
..... Sequencer Step #		42	..... Sequencer Step #

**UL listed circuit breakers needed to complete the SEQUENCING PANELBOARD package.**

- LynTec BMB-15 Bolt-on Motorized Breaker**, Square D #QB0115PL-5393, One pole, 15 Amps. **Special 60" leads.** Square D trip curve: 730-4 (15 and 20 Amp breakers have a HM, High Magnetic rating. HM reduces nuisance breaker trips on high inrush loads like power amplifiers)
  - LynTec BMB-20 Bolt-on Motorized Breaker**, Square D #QB120PL-5393, One pole, 20 Amps. **Special 60" leads.** Square D trip curve: 730-4
  - LynTec BMB-30 Bolt-on Motorized Breaker**, Square D #QB130PL-5393, One pole, 30 Amps. **Special 60" leads.** Square D trip curve: 730-5
- 2 and 3 pole Bolt-on Motorized Breakers are also available on special order. Call for price and delivery.
- UnMotorized circuit breakers for un-sequenced circuits in SP Panelboards.**
- LynTec BUMB-10, -15, -20 or -30** are Bolt-on, 10, 15, 20 or 30 amp single pole. Square D QOB110, QOB115HM, QOB120HM or QOB130. 15s & 20s are High Magnetic.

The part numbers shown above are for the optional **BMB Bolt-on** version of the motorized breaker. [QOB]  
The snap-on **MB** series are stocked in depth at LynTec. [QO]

**The UL listed heart of the Sequencing Panelboard**

Red flag snaps into window when circuit breaker is tripped

Handle functions as a normal circuit breaker.

When switched off or tripped due to overload, the remote control will not turn on power.

When in the normal ON position, the motorized remote control will turn it off.

The motor does not move the handle... it only opens the high current contacts.

Snap on clip with heavy steel force spring.

Contact is held tightly in place on panel board feeder finger.

Under high current stress, magnetic forces actually increase contact pressure.

AC POWER

Spring used as a worm gear drive

Actuator arm

Low voltage motor. Life expectancy: 30,000 On-Off operations.

The time-proven SQUARE D QOPL series motorized circuit breaker.

Using a breaker proven in over 20 years of service, SQUARE D added a motor mechanism in 1986 to provide remote control.

Yes, Virginia, some breakers are intended to be used as switches!

**SEQUENCED AC POWER OUT**

3 wire, low-voltage, 60" pigtail with 600 volt insulation.

Connects to sequencer in low voltage cabinet.

**Controlled circuits**

16 drivers capable of driving the 1, 2 or 3 pole **MB** series motorized circuit breakers.

[In 26 circuit sequencers, sequencer steps 7 through 16 drive two breakers each. Step 7 turns on breakers 7 and 17, step 8 turns on breaker 8 and 18 and so on.]

Sequence timing: 60 Hz supply: 1.06 seconds between steps.  
50 Hz supply: 1.28 seconds between steps.  
ZIP-OFF: 14 msec. between steps.

**DELAY and DELAY POSITION jumpers and timing**

A delay of 0, 4 or 8 seconds provides stabilization time after circuit 2 or circuit 6. Normally the low level equipment such as preamps, mixing consoles, tuners, tape decks and EQ's are powered from these first 2 or 6 A.C. circuits.

Low level equipment sometimes generates pops or clicks during power-up. Delaying the application of power to the power amplifiers eliminates potential loudspeaker damage due to turn-on transients.

The DELAY and DELAY POSITION settings are adjustable by moving push-on jumpers, on the circuit board, inside the low voltage cabinet.

The 0 sec. DELAY is used to eliminate delay for daisy-chained sequencers that supply only power amplifiers in large systems.

**Energy Storage**

A distributed power supply sufficient to ZIP-OFF 16 or 26 motorized circuit breakers 2 seconds after power fails. Zip-off is delayed 2 seconds to prevent power glitch induced sequencing.

**Short Protection**

A 1/2 Amp. fuse protects the sequencer. Power is indicated by the amber LED.

**Indicator LEDs**

Green LEDs, adjacent to each terminal block, light when the ON control voltage is available to the circuit breaker motor.

Red **FAULT** LEDs glow temporarily at initial SEQUENCER POWER breaker turn-on and when the breaker motor actuates. This glow indicates normal capacitor charging or motor current. Any incorrectly connected breaker or a breaker that fails to complete the switch function will cause the FAULT LED to light continuously. When the fault is cleared, the FAULT LED extinguishes. This distributed power supply isolates and indicates faults while the rest of the breakers sequence normally.

**Remote Control Characteristics**

To begin the ON or OFF sequence, a momentary contact to common is required to toggle a latching relay in the sequencer. Momentary contacts are necessary when more than one control location is required.

**ON/OFF Switch Set Specified**

The supplied **SS-2** Sequencer ON/OFF Switch set provides 2 switches with built-in film legends. The ON switch is backlit by an internal 12 v green LED. The SS-2 switches mount in 5/8" round holes on 1" centers. Options: An additional switch set is required for each remote control location. Locking switch plate optional. (Page 1)

**Remote Pilot LED Output**

Pulsed +12 volts DC will drive remote pilot **ON** LEDs up to 200 milliamperes. All **ON** LEDs flash once per second during the on or off sequence cycle. All **ON** LEDs glow continuously at the end of the ON cycle if the **VOUCHER SUPPLY** – **VOUCHER SENSE** terminals are bridged by a resistance of less than 100 K $\Omega$ .

**Power Verification – POWER VOUCHER Sense**

The **V-**, **VOUCHER SENSE** input annunciates a completed sequence by switching the flashing **ON** LED to constant, indicating a full **ON** condition.

This **AND** type input is utilized when LynTec POWER VOUCHERS are used to prove all sequenced receptacles have AC power present. (*No circuit breakers are off, all receptacles are live*).

Typically, one POWER VOUCHER™ is plugged into a receptacle for each sequenced circuit and each un-sequenced circuits that must be powered for proper system operation.

The POWER VOUCHER contains an indicator LED and an opto-isolator. The opto-isolator's output resistance drops to  $\leq 200\Omega$  when AC line voltage is present.

The POWER VOUCHER output terminals are all connected in series and then back to the LynTec sequencer's **VOUCHER SUPPLY** and **VOUCHER SENSE** terminals.

When the **ON** sequence is completed **AND** all POWER VOUCHERS are energized from the receptacles, the pilot **ON** LEDs glow continually. Any un-energized POWER VOUCHERS will prevent a continuous pilot **ON** light, indicating to the operator that the system is **not ON**. Visually scanning all POWER VOUCHERS for a green light will quickly locate the dead circuit.

Jumper the **VOUCHER SUPPLY+** and **VOUCHER SENSE** terminals if power verification is not used.

In the interest of product improvement, specifications are subject to change without notice.

**ON/OFF Low Voltage Connections**

Lever actuated cage clamp terminals accept wire sizes from 18 to 24 gauge.

**Motorized Circuit Breaker Low Voltage Connections**

Each motorized breaker is powered via a 3 wire low voltage connection on the sequencer circuit board. Connections are screw activated clamp terminal strips.

**Control Wire Requirements**

From ON/OFF switch location to **one** SP:

4 conductors, 22 gauge, 10,000 ft. maximum

Between multiple SP's, SP / SLC's or PDS-8's when daisy chained:

6 conductors, 22 gauge, 10,000 ft. maximum

8 conductors if ON/OFF switches are required at each sequencer location.

10 conductors if POWER VOUCHERS are used.

**SEQUENCER POWER**

The SEQUENCER POWER circuit breaker mounted in the #1 position in the high voltage section is connected to a UL listed 120v to 24v, 40 VA transformer mounted inside the low voltage cabinet.

This 10 amp un-motorized breaker should be left on continuously. This circuit breaker is used primarily as an approved, switchable connection method to the high voltage. The transformer is impedance protected.

The sequencer circuitry is protected by AGC 1/2 amp fuse located on the sequencer board.

Power required: 50/60 Hz,  $\leq 10$  watts during sequence,  $\leq 8$  watts idle.

**SP 341 System Mechanical Characteristics**

Dimensions: 36.00" wide x 50.00" high x 6.13" deep. Surface Mount.

Weight: 150 pounds without branch breakers installed.

Shipping Weight: 250 pounds maximum. Truck only.

**Main breaker options**

The SP 341-16, SP 341-26 and SP 341-41 have a factory installed, 3 pole, 225 Amp main breaker (65 kVA).

200 Amp or 150 Amp main breakers are available on special order. Use part number suffix **-M200** (60 kVA) or **-M150** (45 kVA).

Smaller main sizes are also available by replacing large main breaker with a 3 pole, back fed, bolt-on, breaker: **-M30** (7.5 kVA), **-M35** (10 kVA), **-M50** (15 kVA), **-M70** (20 kVA), or **-M90** (25 kVA) or **-M100** (30 kVA.)

**Note** This modification reduces the number of available branch breaker spaces from 41 to 38, hence a **SP 341-41** becomes a **SP 338-38**.

**Other options available - please call 800-724-4047 for more info**

## ARCHITECT'S and ENGINEER'S SPECIFICATIONS

### A.C. Power Sequencing System

All A.C. power for the audio/video system shall be supplied from a time sequenced source capable of being remote controlled from as many locations as desired.

Time between sequence steps shall be no less than 1 second.

Un-sequenced circuits, as required, shall be supplied from the same A.C. source so that a single lever main circuit breaker is dedicated to the sound system.

A means of visual operator feedback shall provide an indication of the progress of the power turn-on or turn-off sequence at each control point.

Sequencing shall have an adjustable time delay between the low level equipment circuits and the power amplifier circuits.

The sequencing system shall be capable of shedding the load within 3 seconds after a power failure and re-sequencing when power resumes without operator intervention.

The Power Sequencing system shall be a LynTec **SP 341-xx**.

xx = **-16** or **-26** or **-41** depending on the required number of sequenced circuits.

**Other LynTec Power Sequencing Equipment****PDS-8E Power Sequencing System**

Sequences up to ten 20 amp AC circuits using G-E RR-7P3 Latching relays.

Daisy chains with LynTec Load Centers, Panelboards or stands alone for smaller systems.

Ask for **PDS-8** brochure.

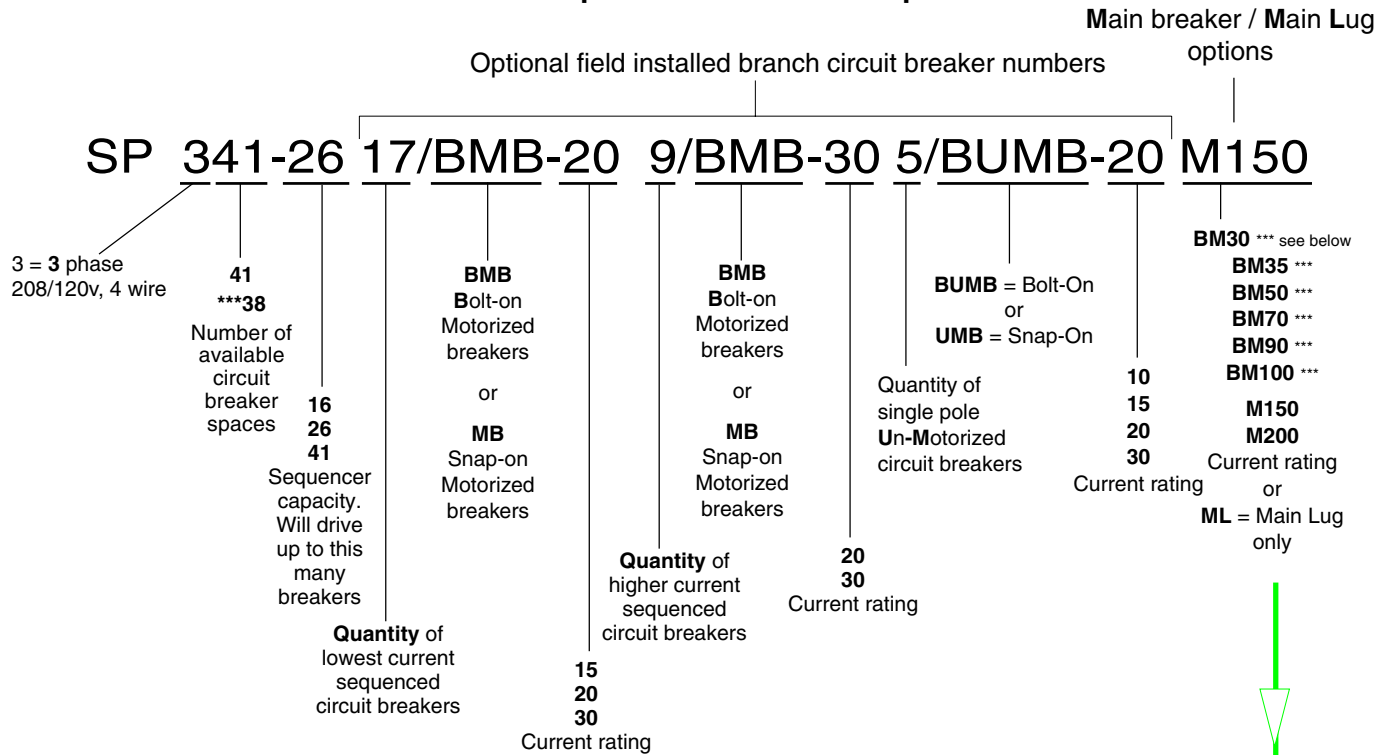
[www.LynTec.com](http://www.LynTec.com)



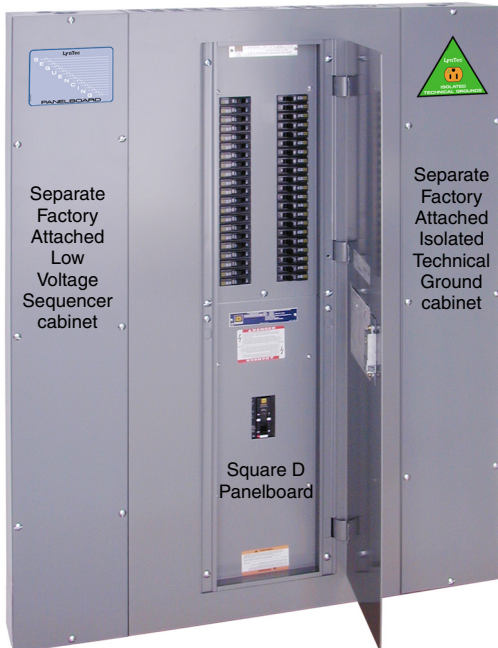
**LynTec, Inc.** • 8401 Melrose Drive • Lenexa, KS 66214  
Voice **800-724-4047** • 913-529-2233 • Fax **888-722-4157** • 913-529-4157

# Specifier's Guide for LynTec Sequencing Panelboards

## SP series part number explanation



SP 341-xx



For Brochures, Manuals  
and FAQs  
Visit our web site  
[www.LynTec.com](http://www.LynTec.com)

### Factory options

**-AR** Auxiliary remote control of circuit breakers #1 & #2. **Add \$50.**

**-RR7** Control of two remotely located 20 Amp, 120v circuits using G-E RR7 relays turned on & off in sync with sequenced breakers #1 and #2. We supply relays, brackets and drive capability. You mount relays in your remote box. 5 low voltage interconnect wires required. **Add \$100.**

Call 800-724-4047 for details

### Main breaker options

The SP 341-16, SP 341-26 and SP 341-41 have a factory installed, 3 pole, 225 Amp main breaker (65 kVA).

**200 Amp or 150 Amp main breakers are available on special order.** Use part number suffix **M200** (60 kVA) or **M150** (45 kVA).

Add \$100 to contractor C.O.D. prices.

\*\*\*Smaller main sizes are also available by replacing large main breaker with a 3 pole, back fed, bolt-on, breaker: **BM30** (7.5 kVA), **BM35** (10 kVA), **BM50** (15 kVA), **BM70** (20 kVA), **BM90** (25 kVA) or **BM100** (30 kVA). Add \$150

**Note** This modification reduces the number of available branch breaker spaces from 41 to 38, hence a **SP 341-41** becomes a **SP 338-38**. Add \$150 to contractor C.O.D. prices for exchange at time of order. Field exchange price: \$200.